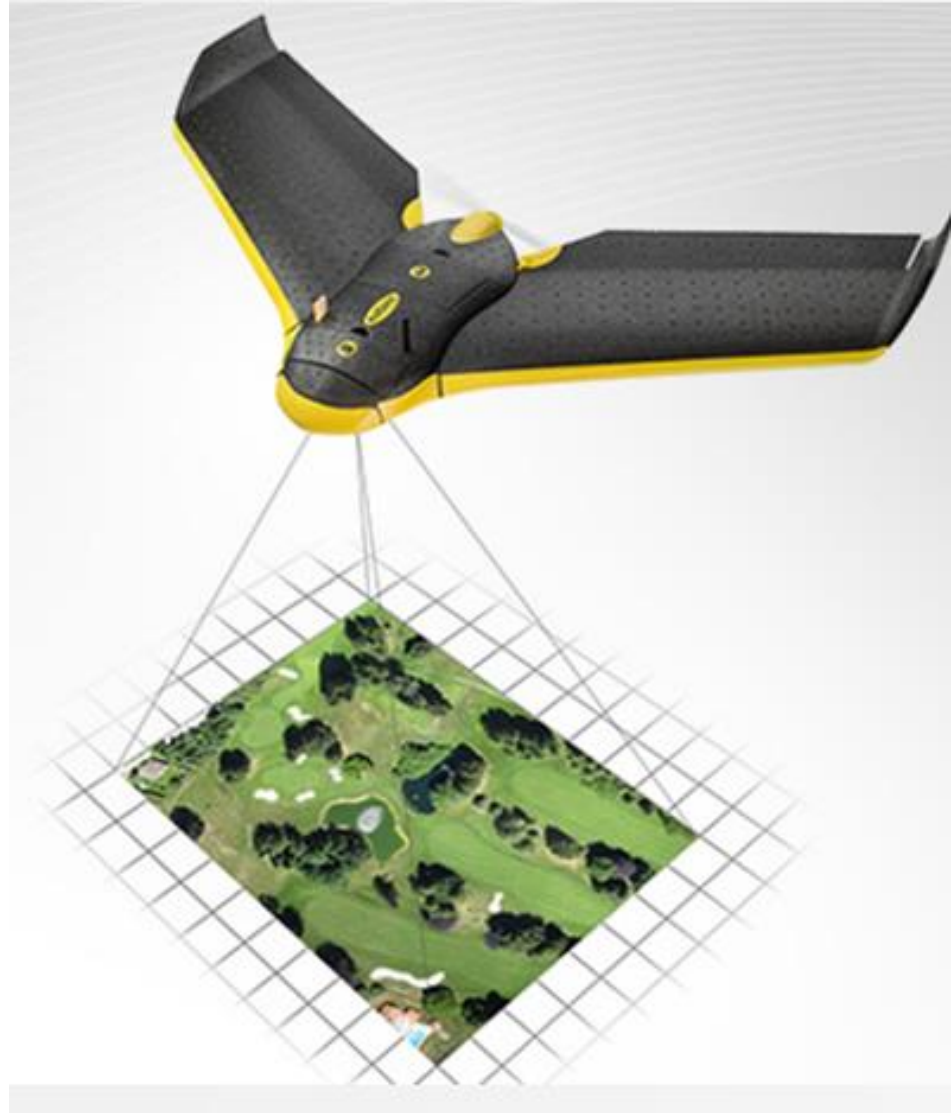


Commercial UAS in the National Airspace



Agenda

- UAS in society
- Legal
- Steps
- Questions



Drones in society: fear and loathing

- The word “drone” brings to mind two images:
 - A weapon
 - Privacy invasion
- Not surprisingly, there is concern even anger when a drone is spotted

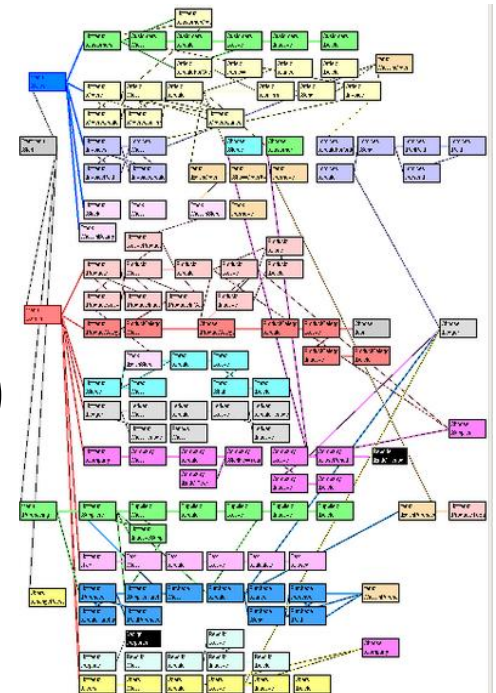


Legal

- The FAA is asserting itself in the national airspace below 500 ft.
- Commercial UAS operations are legal in the US – requires considerable paperwork
- Exemptions
 - Experimental
 - Gvt working for itself
 - Commercial operations have been permitted in almost 100 cases – each requiring an exemption from the code of federal regulations
- In all the above cases, in addition to the exemption, a Certificate of Authorization is required for each flight!
- Non-commercial operations are generally allowed – 2012 law – RC enthusiasts

There is a process

1. Believe nothing unless it comes from the FAA
2. Establish a relationship with the UAS manufacturer
3. Submit a 333 exemption
4. Enlist in flight school
5. Aircraft registration
6. Certificate of Authorization (COA)



Believe nothing

- Lots of rumors
- Vanquish any preconceived notions
- Follow the steps provided by the FAA
- Don't even believe me



UAS manufacturer

- All aircraft in the NAS require a “Airworthiness certificate” from the manufacturer.
- UASs typically don’t have these
- You’re asking for an exemption from that requirement
- The FAA will want detailed plans of the UAS
 - These plans are very proprietary
 - You’ll need the relationship with the manufacturer to get those plans
 - However, they’re more than supportive
 - They’ll likely require a non-disclosure agreement



333 exemption

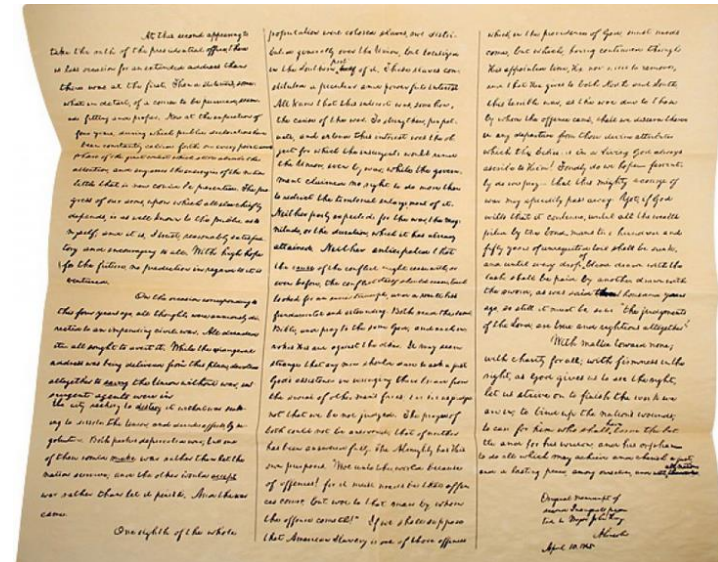
- FAA Modernization and Reform Act of 2012, Public Law 112-95 FEB. 14, 2012, Section 333
 - Essentially, you're asking to put a UAS into the airspace that is normally occupied by manned aircraft



https://www.faa.gov/uas/legislative_programs/section_333/how_to_file_a_petition/

Write up your request for exemption

- Use other's that worked
- They're on the public docket.
 - Here's mine: <http://www.noticeandcomment.com/FAA-2014-0910-fdt-56439.aspx>
- Establish a POC at the FAA UAS integration office – call or email
 - 333exemptions@faa.gov.



Submit exemption

- To the public docket



- The UAS integration office will help you out with the particulars of this.
- Email the proprietary documents to your POC at the FAA UAS office (this way, those docs don't get posted publically)

While you're waiting (at least 4 months)

- Find a pilot that you can hire, or...
- As the FAA requires commercial operation of a UAS by a PIC (Pilot in Command) with a Private Pilot certificate and current class 3 medical certificate
 - Take a flight physical
 - Sign up for flight school
- Wow
- Your looking at about \$10K



Late breaking news! As of yesterday, the FAA relaxed this rule. Now only a sport pilot license and no med cert.

With luck... approval (almost 3 in 4 are approved)

- Lots of stipulations
 - Pilot's license
 - Permission from the land owner
 - Registration
 - Max 400 feet AGL
 - Stay away from people – 500 feet
 - Unless people behind a barrier
 - Daylight only
 - VLOS
 - VO
 - Many miles from airports
 - VHF radio if within 5NM from airport
 - Launch vetoes
 - Electronic fence
 - Horiz and vert
 - Land when other aircraft in area
 - Airspace
 - Etc., etc.

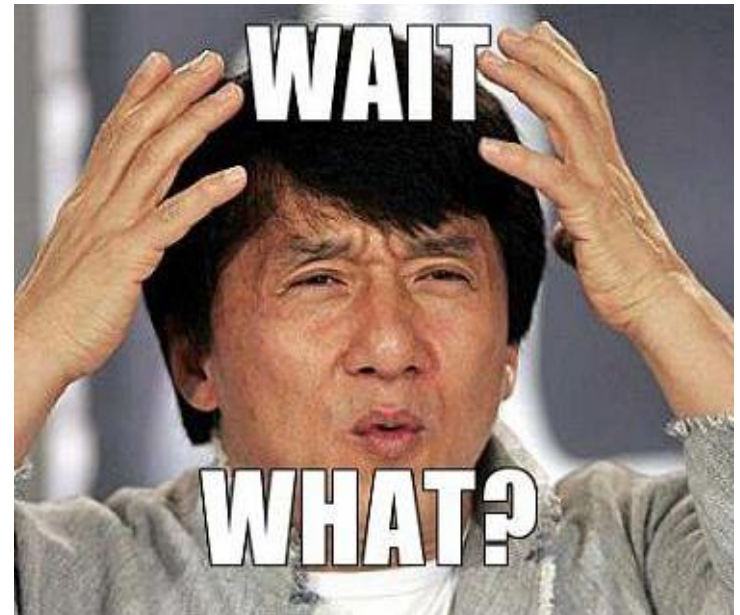


Register aircraft

- Call the registration office, tell them your registering a drone. This is all very new. It helps if they have a heads-up.
- https://www.faa.gov/licenses_certificates/aircraft_certification/aircraft_registry/
- Requires an original registration form. The registration office will mail you one or you can pick one up at a flight standards office in Phoenix (get 3)
 - Submitted form must be perfect – no mistakes – this is why you get three
- Requires a notarized affidavit of newly build aircraft not previously registered (in my case, it may require a note from the government of Switzerland stating that it's not registered there)
- Requires engine type, manufacture, model, and serial number
- Requires a FAA bill of sale form with original ink
- Write out a check for \$5 and send it and everything else to Oklahoma City
- Keep a copy of the form you sent to the FAA, this is a temp (90 day) registration

Now you have *GENERAL* authority to fly in the NAS

- *You don't, however, have specific permission*
- This requires a Certificate of Authorization (COA) for each flight, or block of flights (flying in the same area for a three day project, for instance)
 - Lat / Long / altitude bounding box
 - Time
 - Exemption number
 - Tail number
 - Date, etc.etc.etc.
- This allows the ATC system time to issue a notice to airmen (NOTAM) describing what you're doing and alerting other pilots
- This COA process can take 60 days
- *This is just too hard!!!!*



Blanket COA

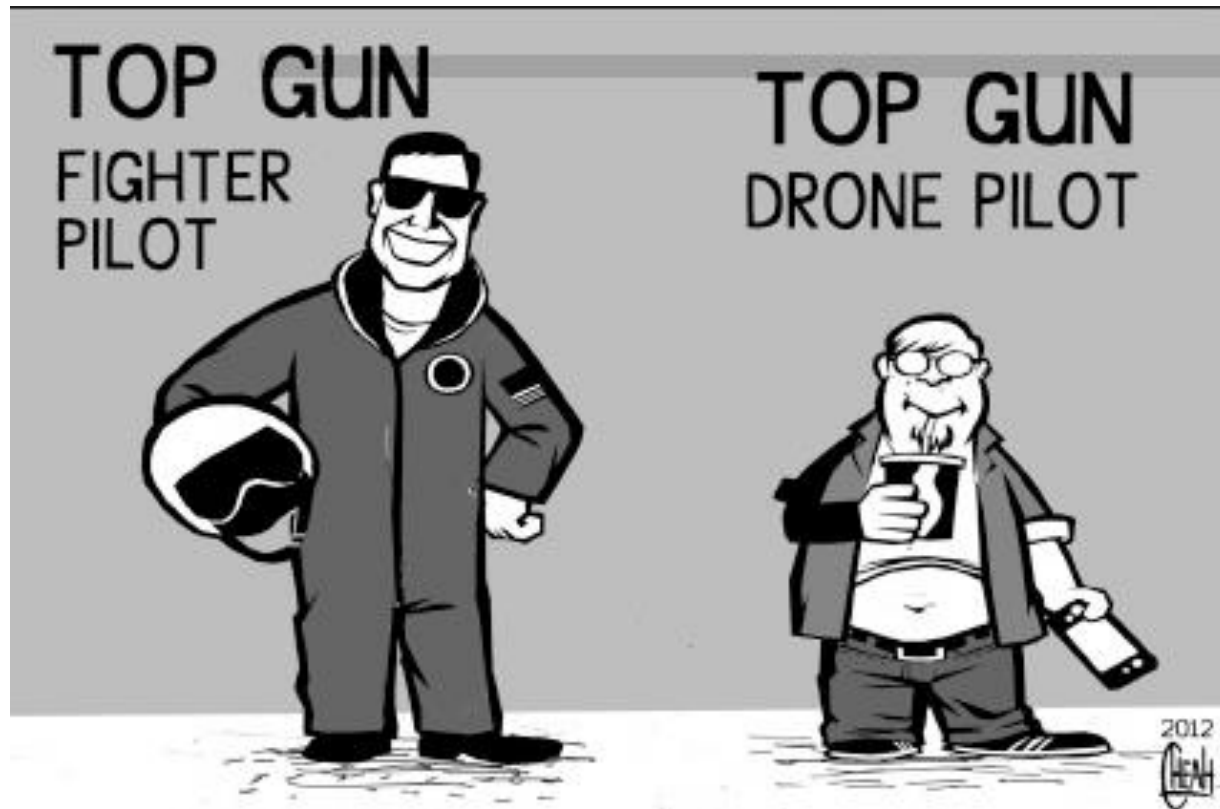
- So, just last month, the FAA granted current and future 333 exemption holders a “blanket COA”
- Allows flights at or below 200 feet AGL and miles from airports with only a phone in NOTAM (24-72 hour heads up)
- And a host of other requirements (monthly activity report, for instance)



Summary

- UAS in society
 - Fear and loathing
- Legal
 - Commercial use is legal, it just takes some time and effort
 - 333
 - COA
 - Private pilot
- Steps
 - Listed on the FAA UAS integration website
 - The folks there are helpful

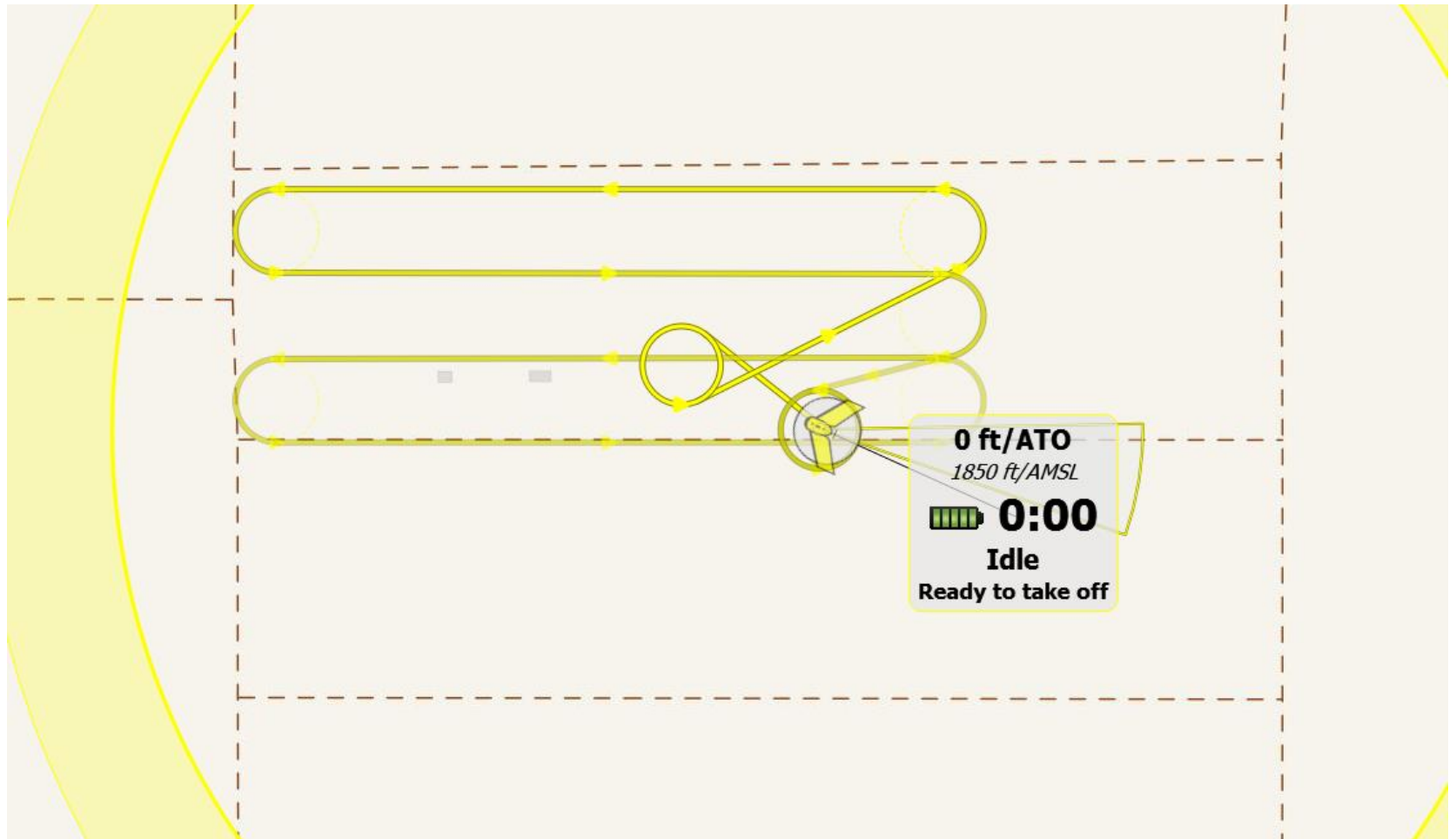
Questions



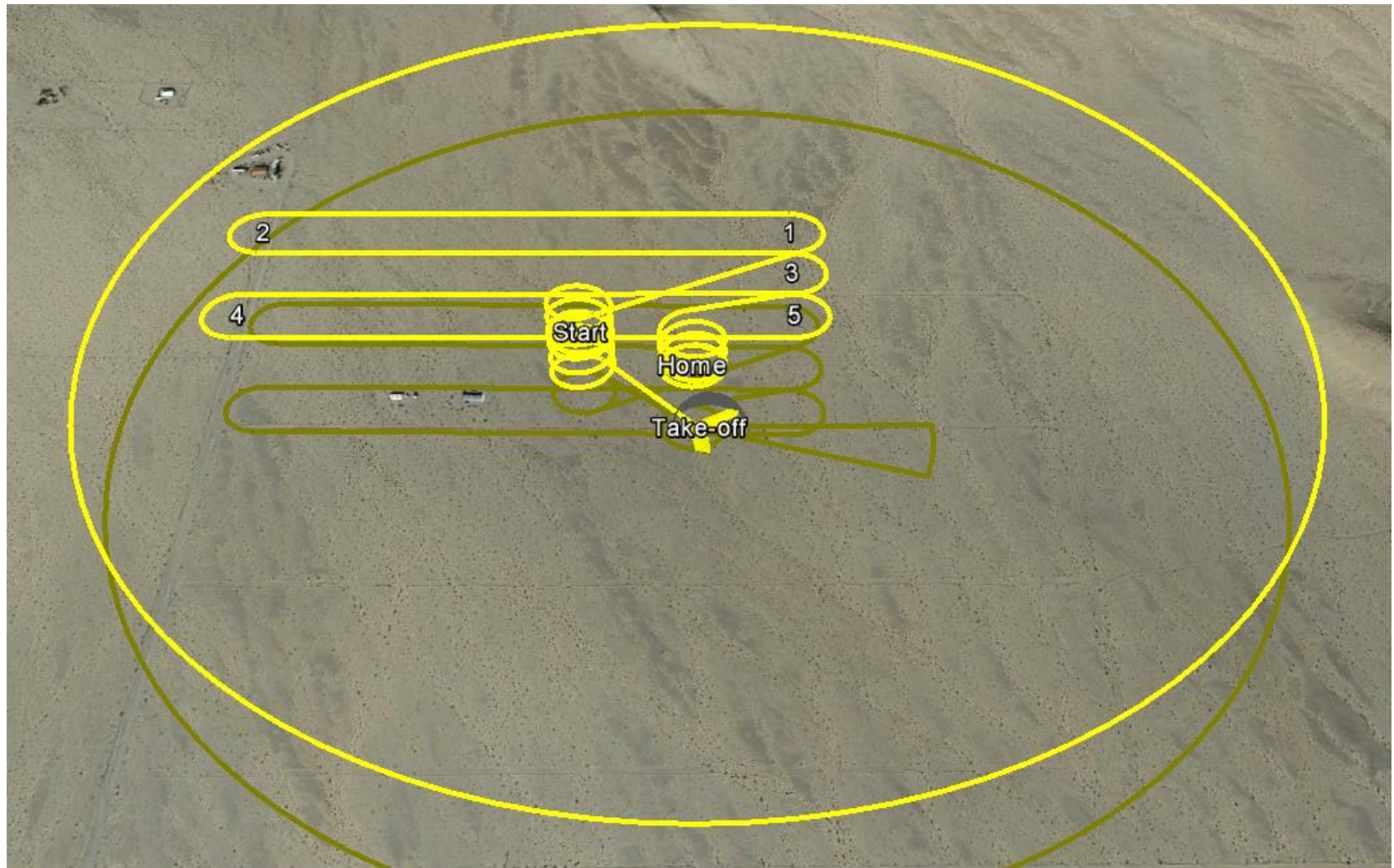
That flight

- Location: Southern California
- Size: 29 Acres
- Flight time: 7 min
- Pictures taken: 39
- Ground sampling distance: 1.42 inches

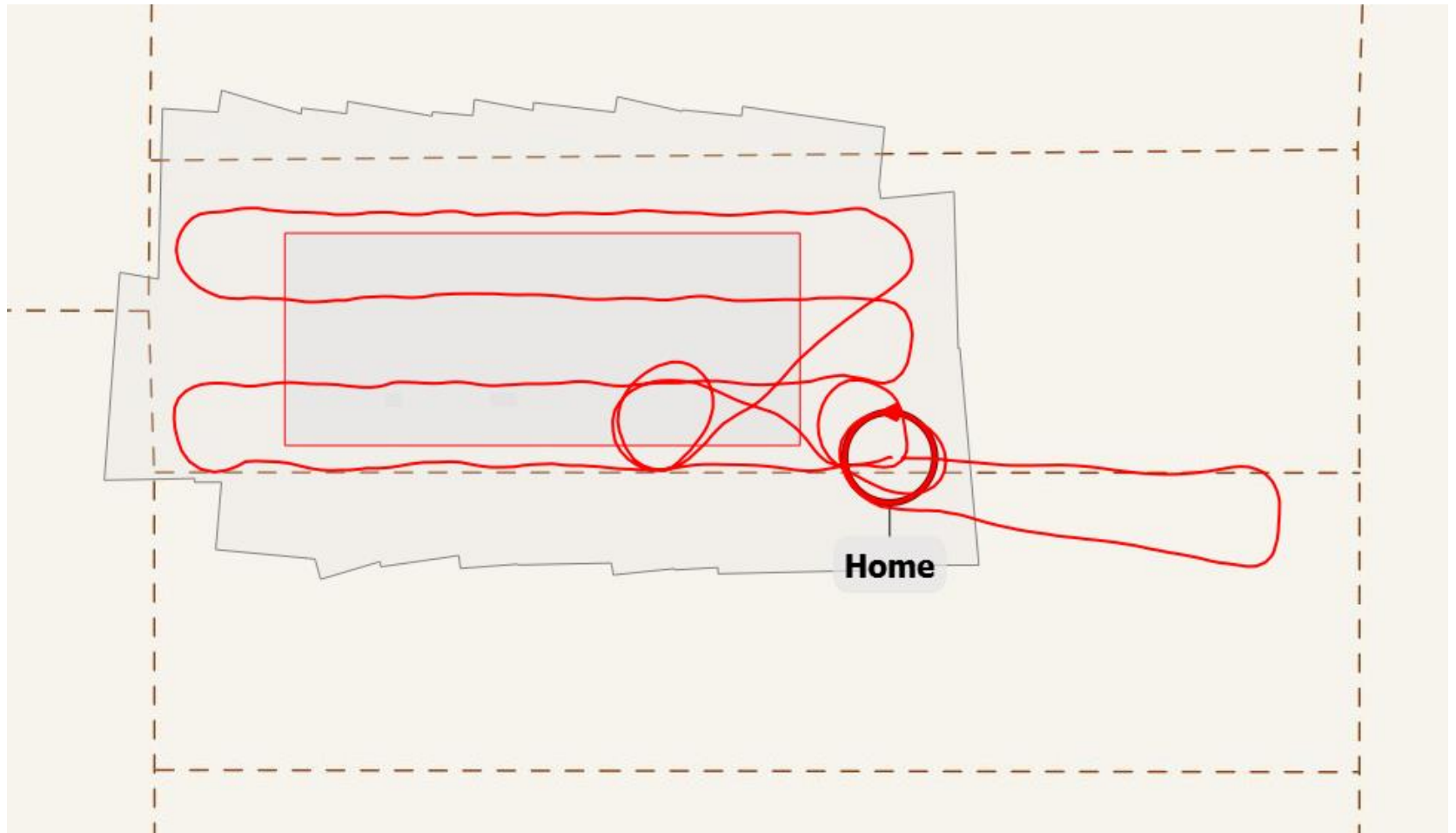
Planning



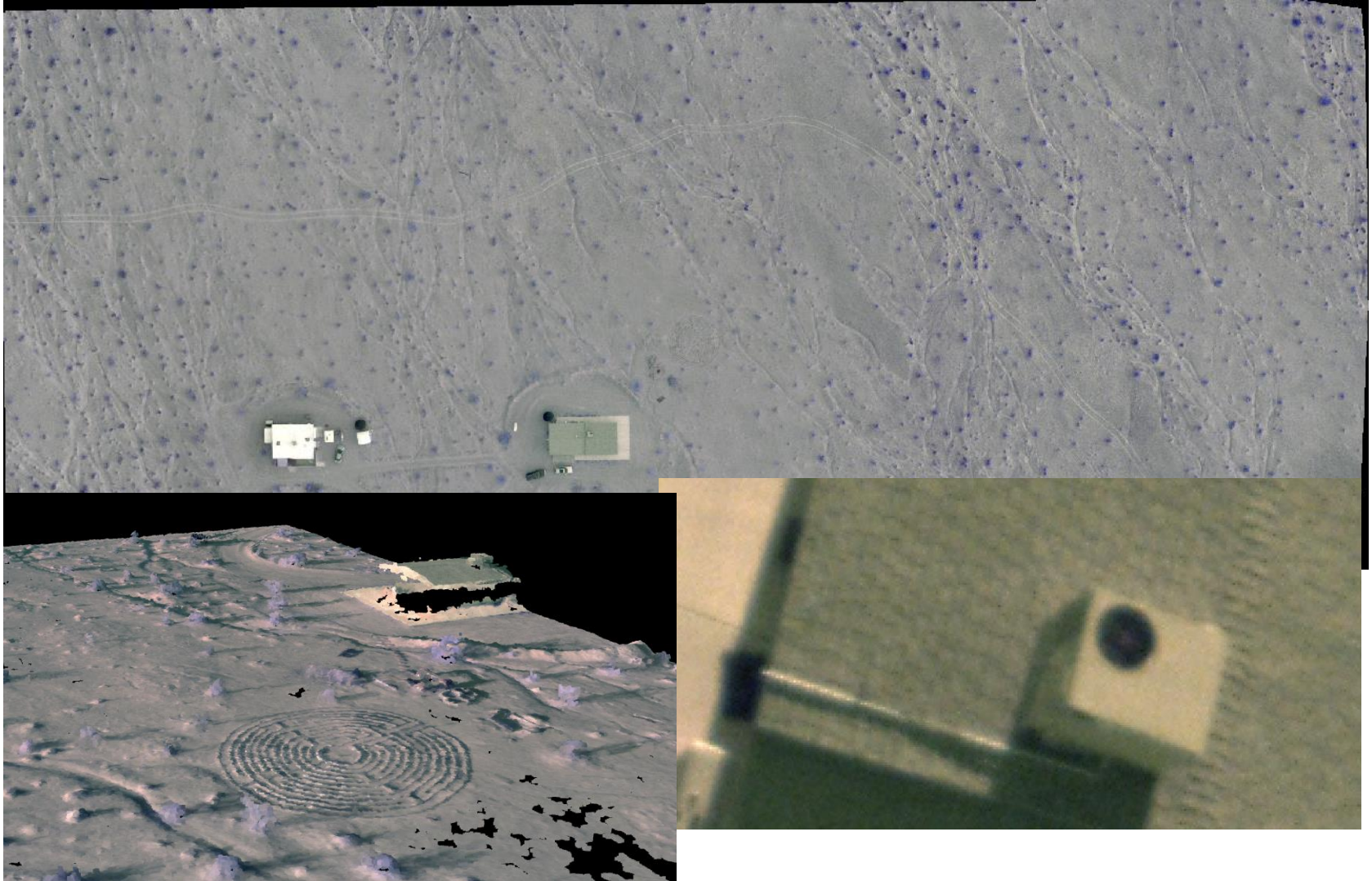
Planning



Execution



Aerial photos and orthophoto

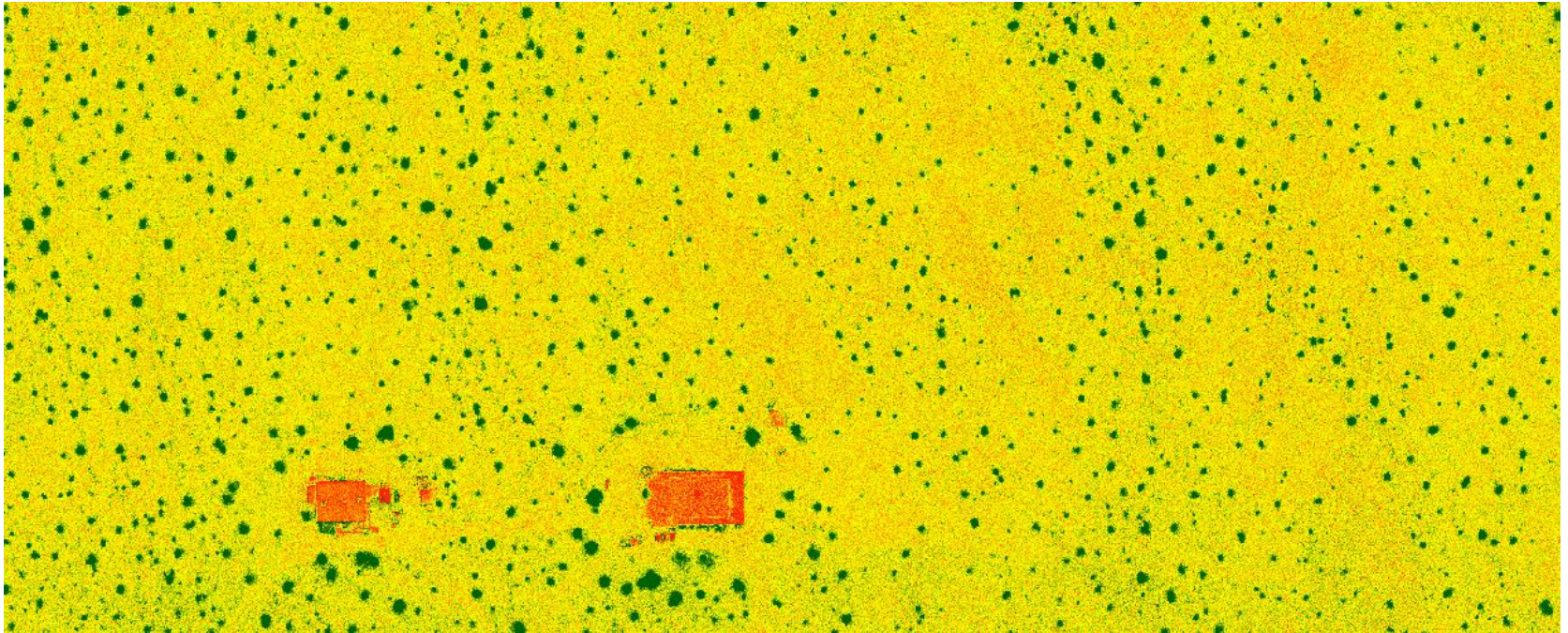


Contours



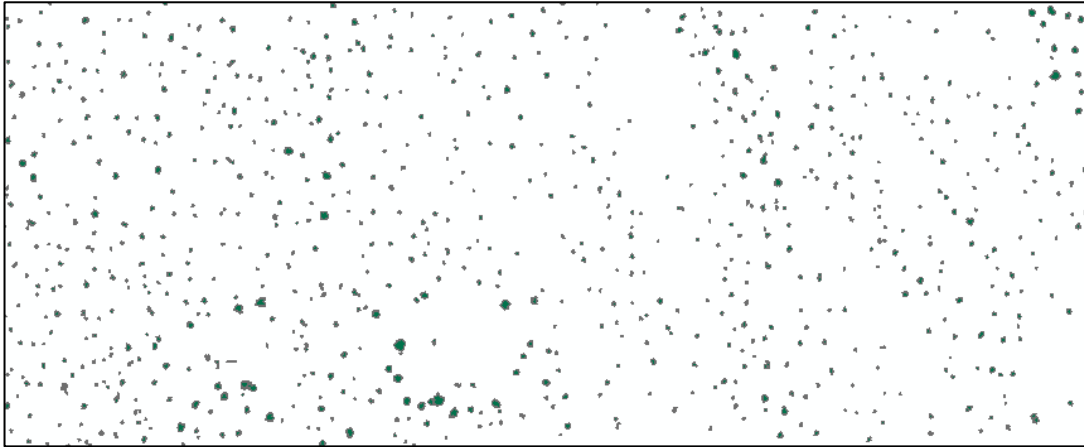
One meter contours labeled in meters and feet

Results (NDVI index)

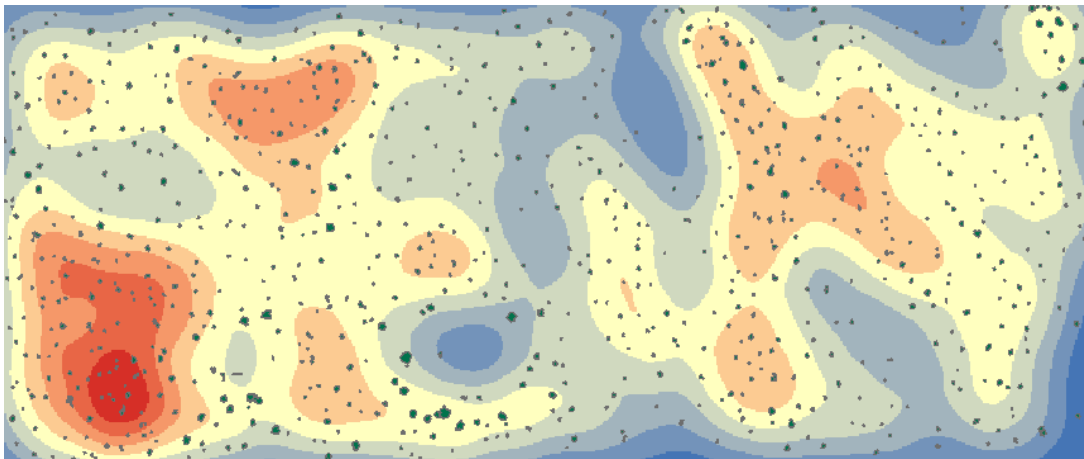


NDVI – creosote bushes

Results (NDVI index)



In this study area, there are 826 creosote bushes comprising about 843 square meters total (0.9 percent of the total area)



Creosote density...